

Site Need Statement

General Reference Information	
1 *	Need Title: Technology to Support Post-Retrieval Evaluation of SSTs
2 *	Need Code: RL-WT115
3 *	Need Summary: An accurate technology or methodology to evaluate tank contents remaining before, during and after retrieval and transfer is needed. This will meet the new requirements listed in Appendix H of the TPA.
4 *	Origination Date: November 2001
5 *	Need Type: Technology Need
6	Operation Office: Office of River Protection (ORP)
7	Geographic Site Name: Hanford Site
8 *	Project: Retrieval and Closure PBS No: RL-TW04, RL-TW11
9 *	National Priority: ___ 1. <u>High</u> - Critical to the success of the EM program, and a solution is required to achieve the current planned cost and schedule. <u>X</u> 2. <u>Medium</u> - Provides substantial benefit to EM program projects (e.g., moderate to high life-cycle cost savings or risk reduction, increased likelihood of compliance, increased assurance to avoid schedule delays). ___ 3. <u>Low</u> - Provides opportunities for significant, but lower cost savings or risk reduction, may reduce the uncertainty in EM program project success.
10	Operations Office Priority:
Problem Description Information	
11	<p>Operations Office Program Description: The overall purpose of the Retrieve and Transfer SST Waste function is to move the waste from the SSTs into preferred storage in the DST system. A primary objective of this function is to develop and test alternative and improved retrieval technologies to past-practice sluicing. As part of this effort Leak Detection Monitoring and Mitigation (LDMM) approaches are being developed for concurrent deployment. To support this effort Cold Test Training & Mock-up Facilities are being established. The baseline end state of the Retrieve and Transfer SST Waste function is:</p> <ul style="list-style-type: none"> • Retrieval of all wastes from the SSTs • The safe, environmentally compliant transfer of this waste to the SSTs • SSTs in a ready state for implementing closure and final disposal of the SST farms. <p>The overall purpose of the Closure function is to close SST and DST tank farms and RPP facilities. Closure of tanks and tank farms assumes that waste retrieval will remove sufficient waste from the tanks that the residual wastes following retrieval, the tanks themselves, the tank farm ancillary equipment, and the contaminated soil will be disposed in place in accordance with applicable regulations and agreements. This strategy also assumes that the residual waste and other tank farm source terms will be considered by the U. S. Nuclear Regulatory Commission to be incidental waste, i.e., non-high-level waste. This function has substantial involvement with studies directed at understanding contaminant migration in the vadose zone and groundwater that are part of the Hanford Groundwater/Vadose Zone (GW/VZ) Integration Project.</p>
12	<p>Need/Problem Description: To measure whether TPA goals (550 curies of mobile long lived radioisotopes, 99% of tank contents for Tank S-112) have been met, SST Retrieval projects need a technology or methodology to evaluate tank contents remaining before, during and after retrieval.</p> <p>To evaluate the performance of the retrieval, the amount of the waste in the tank before retrieval may be determined. This volume determination will also allow a comparison with the estimation from the Best-Basis Inventory.</p> <p>During retrieval, the technology or methodology will be used to perform a volumetric analysis of the amount</p>

	<p>of waste removed from the tank and can be used in support of the determination of the most accurate mass balance.</p> <p>Eventually, the system will be used to determine residual tank waste volume to measure whether TPA waste volume retrieval goals have been met.</p> <p>In addition to measuring against TPA goals, the SST retrieval program's near term projects are tasked with improvement upon the baseline retrieval technology of past practice sluicing. The TMS could be used develop waste retrieval efficiency and cost profiles for the various alternative retrieval technologies. This will assist in out-year planning and address the challenges of funding the baseline scope.</p> <p>Program Baseline Summary (PBS) No.: TW04, TW11 ** Work Breakdown Structure (WBS) No.: 5.02.01.01.01 ** TIP No.: **</p>
13	Functional Performance Requirements:
**	Schedule Requirements:
14	<p>Definition of Solution: Next generation technologies are available commercially, based on Topographical Mapping System (TMS), using the "time flight" laser processing versus the much more complicated and unreliable triangulation technique. This updated TMS will improve the reliability, performance and flexibility of the existing system deployed on SST 241-U-107.</p> <p>An ASTD proposal will be submitted for deployment in this particular case.</p>
15 *	Targeted Focus Area: Tanks Focus Area (TFA)
16	Potential Benefits:
17 *	Potential Cost Savings: \$150K per tank in operations time and accessibility
18 *	<p>Potential Cost Savings Narrative: Measurements (scans) are performed in real time (seconds) not hours. Mapping efforts will not hold up operations. By combining the viewing system and the dimensional mapping in one device, it will save available risers for others operations. The system is a useful and effective support for retrieval (mass balance, leak monitoring) and for post-retrieval (residual waste volume). Due to limited accessibility in Hanford SSTs, the new system would be safely deployable in a four-inch riser, making available several more access points per tank and minimizing costly equipment removal needed to support TMS operation. A combined viewing system frees yet an additional riser for the retrieval system.</p>
**	Technical Basis:
19	Cultural/Stakeholder Basis:
20	Environment, Safety, and Health Basis:
21	Regulatory Drivers:
22 *	Milestones: (will be fixed later)
23 *	Material Streams: Sludge, Salt, Liquid (RL-HLW-20)
24	TSD System: Single Shell Tank systems
25	Major Contaminants: Pu-238, 239, 240, 241; AM-241; U-238; C-14; Ni-59/63; Nb-94; Tc-99; I-129; Cm-242; Sr-90; Cs-137; Sn-126; Se-79; chromium; nitrate; nitrite; complexants (EDTA/HEDTA)
26	Contaminated Media: Tank waste consisting of high molarity sodium hydroxide/sodium nitrate solution containing saturated saltcake and/or sludge.
27	Volume/Size of Contaminated Media: The single shell tanks are generally 75 ft. in diameter, and up to 40 feet deep with their tops buried about 10 feet below the ground surface. All double shell tanks are 75 feet in diameter, and about 40 feet deep, and are similarly buried.
28 *	Earliest Date Required:
29 *	Latest Date Required: Late FY 02 to support S-112, FY 03 to support S-102

Baseline Technology Information	
30	<p>Baseline Technology(ies)/Process: Current topographical mapping system (TMS) technology was designed specifically for use in Hanford tanks, but has been superceded in recent years due to developments and advances in mapping and imaging technologies. Technology is accurate, but time consuming and outdated from a software and data acquisition perspective. Design could be improved upon for use in flammable gas tanks at Hanford.</p> <p>Technology Insertion Point(s):</p>
31	Life-Cycle Cost Using Baseline:
32	Uncertainty on Baseline Life-Cycle Cost:
33	Completion Date Using Baseline:
Points of Contact (POC)	
34	<p>Contractor End User POCs: B. E. (Brian) Brendel, 509-373-1442, F/509-373-6101, Brian_E_Brendel@rl.gov</p>
35	DOE End User POCs:
36**	<p>Other Contacts: K.A. (Ken) Gasper, CHG, 509-371-3607, F/509-371-3504, Kenneth_A_Ken_Gasper@rl.gov</p>

*Element of a Site Need Statement appearing in IPABS-IS

**Element of a Site Need Statement required by CHG